A HISTORICAL ANALYSIS OF TUNNEL WARFARE AND THE CONTEMPORARY PERSPECTIVE

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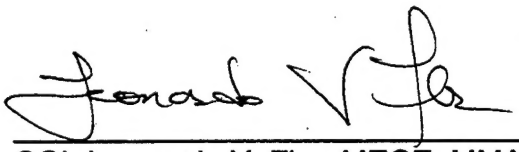

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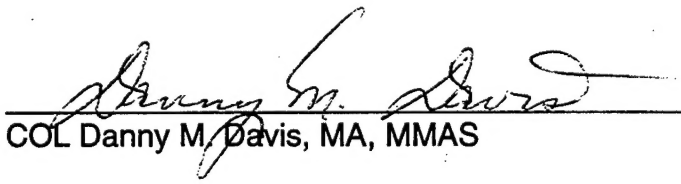

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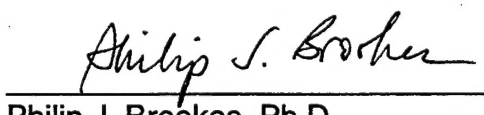

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ABSTRACT

A HISTORICAL ANALYSIS OF TUNNEL WARFARE AND THE CONTEMPORARY PERSECTIVE by MAJ Allen D. Reece, USA, 44 pages.

The threat of tunnel warfare and the adequacy of United States doctrine against such a threat are the focus for this monograph. Having to engage a contemporary enemy in a subterranean fight begs the question: Is our doctrine sufficient in subterranean warfare? If not, then a study of such tactics is necessary before faced with such a threat. The North Koreans are such a threat; through 40 years of experience, they have developed extensive tunnel networks that will be a part of their infiltration routes into Seoul should they decide to invade the South.

This paper reviews 130 years of subterranean warfare, certain principles of war from FM 100-5, the current threat in North Korea, and current United States Army doctrine. Through this study, the monograph examines the effective use of tunnel warfare throughout the years. It looks at the future threat to United States' forces, and will cover lessons learned, specifically, from the Vietnam era.

The final portion of the paper is the likely results should Allied forces and North Korea fight. This leads to a recommendation for combating threats such as the one in North Korea and attempts to answer the question: is there sufficient doctrine to combat this threat, and who gains the advantage in the fight? The answer is yes, the doctrine that is available will allow the United States and its Allies to fight and win on the subterranean battlefield.

TABLE OF CONTENTS

I. INTRODUCTION

If we should have to fight, we should be prepared to do so from the neck up instead of the neck down.[1]

–Jimmy Doolittle

Is United States Army doctrine adequate against the threat of subterranean warfare in contemporary times? This is the question this monograph attempts to answer. Leaping back 30 years to the days of Vietnam, there were numerous examples of elaborate tunnel complexes utilized by Vietnamese forces. Today, the North Korean Peoples' Army pose a threat to Allied forces in Korea, having had over 40 years of experience developing their subterranean tactics. Were lessons surrounding subterranean tactics taken away from past conflicts, and if so, were they significant enough to be a concern for leaders who are preparing for tomorrow's battlefield? Perhaps doctrine that focuses on war of this nature is of no importance. However, if the opposite is true, the development of such a doctrine should take place before faced with a cunning enemy and a costly fight. In an effort to determine what has been learned and what needs to be attained, this paper begins first with a review of former examples of subterranean tactics and their effects on various principles of war from Field Manual 100-5, *Operations*. Second, it reflects on the current status of the North Korean Peoples' Army and their subterranean capabilities. Finally, the monograph closes with a discussion on innovations from Vietnam, current United States

Army doctrine, and an analysis to determine who will gain the advantage in a subterranean fight.

The overall discussion begins with a Civil War account of the Peninsula Campaign and the Battle of Petersburg. During the Peninsula Campaign, the Confederates at Yorktown completely stalled the Army of the Potomac. Earthworks, 15 feet thick, encompassing a network of underground shelters, hampered the Federal advance.[2]

The World War I Western Front saw the idea of entrenchment develop as a tactic to protect the United States and Allied forces as they maneuvered along the battlefield. The Germans, however, utilized tunnels for counter actions against the trenches. Thus, the innovation of trench and tunnel warfare became a standard tactic.

In World War II, as United States forces assaulted onto the beaches of Okinawa and Peleliu, they found that the Japanese made no attempt to defend the beaches. Instead, the Japanese fell back to prepared cave and tunnel defenses within inland hills. Bitterly defending every inch of ground, the Japanese entrenched in these well fortified positions and were able to continue organized resistance for months.[3]

Wars in Korea and Vietnam reveal additional subterranean warfare lessons to the United States Army. Indeed, the communists in Korea made full use of many tunnels in mountainous terrain. The mountainous positions created operational difficulty for United States and Allied forces because the tunnel networks were interwoven with caves. In many cases the Koreans were able to house entire units in these subterranean mazes. The Vietnamese proved capable of developing tunnel networks that could extend up to 200

kilometers. The Vietnamese systems were capable of housing entire civilian villages for extended periods of time. Their facilities came equipped with hospitals, storage facilities, and living accommodations. These unique subterranean systems, however, presented problems for American soldiers. They provided the enemy forces the ability to fight virtually undetected. The tunnels also acted as storage facilities which were difficult to locate and relatively safe from air strikes. Finally, these crude dwellings provided strong safe havens for enemy forces.[4]

In each example, the opposing forces' use of subterranean tactics had a profound effect on the forces they encountered. Today, United States forces use the principles of war outlined in Field Manual 100-5, *Operations*, as their warfighting guide. However, these principles of war considerations, can be neutralized by reckless disregard for subterranean warfare. For example, Field Manual 100-5 states that the offensive is the opportunity for forces "to gain the initiative and seize a common objective while allowing for freedom of action."[5] In each historical example the offensive was slowed or stopped. If subterranean warfare diminishes measures derived from the application of principles of war, then the United States Army must have appropriate doctrine to counter its effects.

If recent events are any indication, the North Korean People's Army is one of the likely threats of the future for the United States military. Currently they have a military strength that exceeds a million men under arms. Their doctrine can be considered a combination of conventional Soviet Union tactics and unconventional warfare. Their extensive tunnel capability has evolved over 40 years of planning and improving. Between

1974-78 several large tunnels were discovered under the Demilitarized Zone, one of which was 246 feet below the surface and wide enough to move over 10,000 North Korean troops per hour. Capable of massing forces and appearing virtually anywhere, the North Korean threat is real and staring United States forces in the face.[6]

The United States Army currently has doctrine that could prove to be effective in combating a subterranean enemy. Field Manual 90-8, *Counterguerrilla Operations*, for example, specifically discusses tunnel warfare. Its focus, however, is a Vietnam era threat where the tunnels are narrow and trafficable to only one person at a time.

The historical portion of this paper demonstrates past effectiveness of subterranean warfare. Additionally, it should stimulate one to wonder if any of the tactics that United States forces have used over the years to counter such a threat are still viable today. As this monograph will demonstrate, Korea has the ability to employ forces from underground positions. This is a reality that faces the United States soldier. The North Korean tunnel networks are more complex than those encountered by United States forces in the past. Unlike those of Vietnam, where one person could pass through at a time, North Korean tunnels can allow large numbers of personnel and equipment to move rapidly.

With this knowledge, the fundamental question remains: Is United States Army doctrine adequate against the threat of subterranean warfare in contemporary times? The magnitude and capability of the North Korean tunnels dictate that it is time to give serious consideration to upgrading doctrine. This monograph reveals that the creation of such

doctrine will not require a new start. Merely a fine tuning of innovations and ideas that currently exist is all that is required.

II. SIGNIFICANCE OF A SUBTERRANEAN THREAT

Know the enemy and yourself; in a hundred battles you will never be in peril.[7]
–Sun Tzu

The significance of a subterranean threat is the difficulty in combating such a threat. The earth can provide a fortification that is nearly impenetrable. Associated with the difficulty involved with subterranean combat is the enormous cost in human life to defeat the threat. The tactic of cave, trench, and tunnel warfare dates back to the beginning of time. This historical analysis begins with the Peninsula Campaign during the Civil War. It then works through each successive war ending with Vietnam. This historical perspective shows how advantageous subterranean warfare can be on the battlefield. Additionally, this section discusses the effects subterranean warfare has had, as they apply to the various principles of war taken from Field Manual 100-5, *Operations*. This background sets the stage for determining if this threat is significant enough to develop United States Army doctrine to combat a future subterranean threat.

Civil War Entrenchments

On April 2, 1862, General George B. McClellan arrived at Fort Monroe and surveyed his battleground. His plan was to move rapidly up the peninsula and establish a base near West Point, at the head of the York river. The primary obstacle that stood in his way was the hamlet of Yorktown. According to McClellan's best information, the

Confederates had surrounded the town with earthworks, building upon the eighty year old fortifications erected by the British during the Revolutionary War. Thus, McClellan faced an impediment of 15,000 armed troops in heavily fortified positions.[8]

Just three days later, on April 5, 1862, the lead corps of McClellan's army arrived at the front of Yorktown and came under artillery and rifle fire. Facing McClellan were parapets 15 feet thick, fronted by ditches up to 10 feet deep and 15 feet wide. Additionally, a network of underground shelters called bomb proofs were part of the defense.[9] General McClellan stopped his entire Army while deciding a strategy to combat the series of tunnels and mounds of earth that lie before him. His delay took so long that the Confederate army was able to increase its strength by 50,000 men.

Finally, one month after his arrival on the peninsula and after countless conversations with President Lincoln, his army was ready to advance. To his surprise, however, the Confederates had quietly withdrawn. McClellan achieved victory at Yorktown without firing a shot. Yet, to say victory was achieved may be a misnomer. The delay was a moral victory for the South.[10]

The use of subterranean tactics appeared again as General Grant found himself faced with an underground menace in and around Petersburg in 1864 (diagram 1). The miles of entrenchments located there reminded one Federal soldier of an immense prairie dog village, and were based on established fortification principles honed by three years of war. First, the works consisted of a series of low-lying forts connected by trench lines that were often two or more rows deep. Second, the lines were linked to positions in the rear by zigzagging

communication trenches called *boyaux*. And third, these trenches fed into dug in routes often protected by roofs made of logs and earth so that a wagon train could pass in safety within a few hundred yards of the enemy.[11]

On an attack of this elaborate Petersburg fortress, 400 Pennsylvanians pushed forward a little farther than the units on either side of them. But a mighty maze of entrenchments, later known as Elliot's Salient because it was commanded by Brigadier General Stephen Elliot, Jr., halted their advance. It was Lieutenant Colonel Henry Pleasants, in charge of the 48th Pennsylvania, who conceived the plan for destroying Eliott's Salient. His men would run a tunnel underneath the salient and blow it out of existence.[12] Once again an earthworks fortification stopped the offensive drive of an army. The uniqueness of this particular situation was the idea of the opposing force attempting to counter the fortress with an early application of tunnel warfare. As this battle illustrates, it was an ingenious tactic.

When General Grant gave reluctant approval for the tunnel operation, miners began the tunnel in the ravine behind their lines, protected from enemy observation. Working in shifts, around the clock, they were soon burrowing forty feet a day through sand and clay. A contemporary drawing of the mine (drawn to scale vertically but not horizontally) traces the tunnel that ran for 510.8 feet from behind Union lines to the Confederate salient (diagram 2). Once the miners had tunneled under the Confederate works, they branched out. To fabricate a wide breach in the enemy line, they extended two lateral shafts from the main gallery. Each shaft housed four magazines that were stocked with black powder and

linked to a single fuse. When the fuse to the explosives was lit, the explosion obliterated the tip of Elliot's Salient, which housed a four gun artillery battery, and paralyzed half of Elliot's brigade of infantry. At least 22 gunners of the battery, along with 256 men of the 18th and 22nd South Carolina, the regiments flanking the guns, died in the blast.[13]

This Civil War example reveals how the element of surprise can deliver decisive results on the battlefield. This is also an excellent example of the offensive use of subterranean tactics. In fact, had the Federal soldiers gone beyond Elliot's Salient, surfacing prepared to fight while continuing the advance, they might have accomplished something akin to the modern vertical envelopment.

What advantages did the earthworks, entrenchments, and tunnels provide to the forces fighting against these fortification techniques? In terms of modern day principles of war, the first effect was that of delaying or stopping the offense. The second effect was that of mass. In each example the Confederates were able to concentrate their combat power in one decisive area. Third, with the massing of force also came economy of force which allowed the Confederates to employ their available combat power in the most effective ways. Fourth, the unique fortifications allowed for the unity of command. And finally, surprise caught McClellan's forces at a disadvantage just as Grant's army caught the Confederates at a disadvantage with the tunnel under the salient.

Trenches of World War I

World War I, a war where new technology and tactics entered the battlefield, saw one battlefield trait remain: the soldiers' ability to use the land for protection. Although

fortification was part of World War I combat, large numbers of casualties continued on the battlefield, especially among the officer corps. The concern, according to Colonel Tanant, a staff officer with Third Army, was that general officers would not direct operations from their proper place in the rear, but lead from the front; "they performed the function of corporals, not commanders."[14] To better preserve the leadership, and to protect themselves, combat forces found the need to entrench. One unit, shoveling all day in its shirt sleeves under the hot sun, dug trenches deep enough to shoot from standing up.[15] The significance of this is survivability. Soldiers found that these entrenchments did provide protection from new weapons they faced. Additionally, their trench systems allowed for a more secure means of command and control by enabling the leadership to move back and forth along the trenches regulating the action.

The Germans, however, were not long in finding a way to combat the trench systems. On 20 December 1914, the Germans made the first underground attack of the war. It came at the southern extremity of the British line, where Indian troops were entrenched. The Sirhind Brigade was holding a mile of the front ten miles south of the French-Belgian border, near Festubert. The Indians, already suffering from the rigors of the European winter, were first battered and shaken by artillery fire during the early morning. Then, three mysterious flares were seen arcing high into the air from the German lines. Next, a loud rumbling sound sped along 1,000 yards of the Indian trench. The ground beneath the soldiers feet shuddered, split apart and punched upwards with tremendous force. Ten mines had been detonated from a tunnel beneath the surface of the trench.[16]

Shocked by the inexplicable nature of the blow and dazed by its violence, the surviving Indians scrambled from the trench and ran rearwards, pursued by deadly mortar fire. Waves of German assault troops then raced over no-man's land and occupied the position without loss. The effect on morale of the already sorely tried Indian troops (and on others as the news spread) was serious. Some units refused to stay at the front, and a few days later the whole Indian Corps was temporarily withdrawn to be the reserve.[17]

As subterranean tactics escalated, notable examples became more common. One such example on the Western Front in 1917 occurred during a British led offensive in Flanders. As the French suffered major difficulty against the Germans in an attempt to cut in behind a great bulge in the line between Soissons and Arras, the British took up the struggle. First came a limited attack to straighten a minor bulge in the line known as the Messines Ridge. Working like moles, the British dug five miles of underground tunnels, laid a million pounds of explosives, then literally blew up Messines Ridge. Killing some 20,000 Germans, the British successfully secured the ridge.[18]

The World War I example was much like the Civil War example. It reinforced the idea that subterranean tactics can add a significant offensive capability in war. The trench systems of World War I affected the ability to mass forces and to focus combat power at a decisive point on the battlefield. The trenches allowed for economy of force and unity of command. For the most part, trenches were secure areas of operations; not until the Germans began to tunnel beneath the trenches and set-off mines did this security begin to dwindle. Using tunnels, mines became more effective through the principle of surprise.

Indeed its employment was a very difficult tactic to defeat. Assuredly it had a profound effect on the opposing forces morale.

Japanese Tactics in the Western Pacific

The Japanese, already known as tenacious fighters by United States servicemen, would maximize their capabilities by establishing a strong point defense utilizing cave warfare. Incredibly some of the hundreds of caves were more than a story high. Practically every cave had multiple exits and tunnels connecting to other caves. The size of cave exits varied, but most were small, as little as two feet square to escape detection, because they doubled as weapons embrasures, and to provide as little space as possible for the entry of enemy artillery shells.[19]

September, 1944, saw the 1st Marine Division land on the island of Peleliu as part of a plan that would eventually allow General MacArthur back into the Philippines. Peleliu was significant to all Marines' in the Pacific because of the changes in Japanese tactics encountered there. The Japanese abandoned their conventional all-out effort at defending the beach in favor of a complex defense based upon mutually supporting, fortified positions in caves and pillboxes extending deep into the interior of the island, particularly in the ridges of Umurbrogol Mountain.[20]

The Japanese commander on Peleliu, Colonel Kunio Nakagawa, let the Marines come to where approximately 10,000 troops of his 14th Infantry Division were waiting in well dug, mutually supporting positions. The Japanese covered nearly every yard of Peleliu from the beach inland to the center of Nakagawa's command post. Some positions were

just large enough to hold only one man, some caves a hundred. Thus, the Marines encountered no one main defense line. The Japanese had constructed the perfect defense-in-depth, with the whole island as a front. They fought until their last position was knocked out.[21]

Aided by the incredibly rugged terrain, the new Japanese tactics proved so successful that the 1st Marine Division suffered more than twice as many casualties on Peleliu as the 2nd Marine Division had on Tarawa. Proportionately, United States casualties on Peleliu closely approximated those suffered later on Iwo Jima, where the Japanese again employed an intricate defense-in-depth, covered forces, and fought a battle of attrition.[22]

On April 1, 1945, three United States Army divisions, the 7th, 77th, and 96th, and three Marine divisions, the 1st, 2nd, and 6th, executed the assault on the main objective, Okinawa. The Japanese made no attempt to defend the Okinawa beaches, but instead fell back to their prepared cave and tunnel defenses within inland hills. Bitterly defending every inch of ground, the Japanese continued organized resistance until late June. United States forces found themselves faced with an enemy that was well entrenched and capable of moving to different locations on the battlefield via tunnels. Through the use of this system, the Japanese stalled the United States offensive for two months.[23]

The Japanese use of a fortified defense had a stifling effect on the offensive capabilities of the Marines. Their dug in positions along with their occupation of natural terrain such as caves made it very difficult for the Marines to mass combat power. Additionally, the Marines were unable to use economy of force because the Japanese were

spread out and difficult to detect. Maneuver for the Marines was almost impossible. They were fighting up hill against a well entrenched enemy in mountainous terrain. The task facing the Marines was nearly impossible.

Tunnels of Korea

A classic scenario from the Korean War era was that of K Company, 180th Infantry and a tank platoon as they moved north to the Pokkae area to engage the enemy. The Infantry closed to within hand grenade range, but found that the Chinese had honeycombed the heights east of the town with bunkers, trenches, and tunnels. Since there was little hope of penetrating and destroying the strong position K company, broke contact and returned to the main line of resistance.[24] An added feature to the Chinese earthworks was the fact that they were found on high ground.

Following a series of artillery barrages and an air strike by the Fifth Air Force, E and F companies, 180th Infantry, began a new attack from the southeast against heavy small arms, automatic weapon, artillery, and mortar fire. Although the duration of the actual fight was not discussed, the 180th Infantry eventually took the objective.[25] The United States lost scores of soldiers in the attack up the hill, while the Chinese defensive force, consisting of four squads, resisted a numerically superior enemy through tunnel warfare.[26]

The Chinese resort to tunnel warfare, and the devastating losses to American soldiers, led to the sealing of tunnel entrances by the United Nations Command. According to later prisoner of war interrogations, Chinese officers had killed a number of their own soldiers in the tunnels because the latter had wished to dig their way out and surrender to

the United Nations Command. After the 45th Division forces secured the hills, they opened the tunnels and captured the Chinese who were still alive and willing to give up.[27]

The principles of war underscored the most by this historical example was once again the inability of the United States forces to mass and to economize their forces through a strong offensive effort. The Chinese were able to stop the advance of an Infantry force, stifle their initiative, and create a delay in the action while United States forces prepared for another attack. Due to the uniqueness of the Chinese positions, surprise was impossible and maneuver non existent for United States soldiers.

Tunnel Warfare in Vietnam

The tunnel networks in Vietnam were dangerous obstacles for United States forces. They afforded excellent cover and allowed the enemy forces to pop-up at any time. Additionally, the tunnels allowed Viet Cong forces to disappear at will. Fortunately, the tunnels of Vietnam were primarily used by villagers in an attempt to remain untouched by war. For example, Vin Moc, north of the Demilitarized Zone, was bombed more than any area during the Vietnam air campaign. In fact, according to a television documentary aired on Kansas City Public Television, 25-50 tons of bombs were dropped throughout the course of the war. The people of the area sought survival in the only manner possible, underground. Markets, schools, theaters, and hospitals at Vin Moc were constructed in a similar manner. Basically, the village survived by creating a subterranean habitat. The villagers used nothing but shovels, hoes, and baskets to construct the tunnels. Some systems would have at least thirteen entrances about one meter apart with three levels for

sleeping, cooking, and air raid sentries An excellent example of such a network was the Cu Chi tunnels (diagram 3).[28]

In addition to civilian survival, the tunnels obviously had military significance. As the 1st Battalion, Royal Australian Regiment was pulling out of Vietnam in 1966 it was credited with one of the biggest intelligence coups in the war up to that time. During operations in the "Iron Triangle" near Saigon, the unit discovered a vast complex of tunnels, dug sixty feet deep in some places, which turned out to be a Viet Cong headquarters. To add to the layers of confusion surrounding the Vietnam War it was now further clouded by the attempt to determine which tunnels housed enemy positions.[29] The end result of such vast complexes was that they allowed the enemy to better survive bombing, to appear and disappear at will, and to operate an efficient logistics system under primitive conditions. By the end of 1970, 4,800 tunnels had been discovered by United States and allied forces.[30]

The tunnels of Vietnam were a means of fighting and surviving for many of the Vietnamese people. They were able to delay, and in many cases, stop units with simply the threat they posed. Their extensive tunnels caused the Infantry to move cautiously, thus slowing offensive operations of United States and allied forces in country. In having to combat these tunnels, forces from the United States would send one soldier with a pistol and a flash light into the network. This definitely reduced maneuver and mass but enhanced economy of force. If the effects were this profound, were the lessons documented for future generations of warriors? What adjustments have United States doctrine writers made to lessen the effects?

The Principles of War

The foregoing historical review underscored problems that forces dealing with a subterranean threat faced. It also highlighted the significance of certain principles of war in the analysis of subterranean warfare. These principles are: offensive, maneuver, mass, economy of force, and surprise.

The offensive, according to Field Manual 100-5, is designed "to seize, retain, and exploit the initiative."[31] In each case an army on the move was delayed or halted due to the tremendous effects brought about by subterranean tactics used by the enemy. General George McClellan's case is perhaps the best example. He was stopped for such a long period of time that the Confederates actually slipped away. In another example, the Marines on the beaches of Okinawa and Peleliu had a difficult offensive fight because of the Japanese's ability to prepare a strong defense in the hills and caves of the islands. As the offensive ground to a halt, regaining the initiative proved to be a difficult task.

Maneuver, as stated in Field Manual 100-5, is an effort "to place the enemy in a position of disadvantage through flexible application of combat power."[32] This ability is stifled when a combat unit that is on the move encounters an entrenchment or a tunnel network in its path. The maneuver force can be pinned down with fire from the defense, possibly causing attrition, delaying movement, and denying the initiative. This was the case described in Korea. Infantry units attempted more than once to maneuver into position to overrun the Koreans, yet were forced to retreat.

Field Manual 100-5 states that Mass is the ability "to mass effects of overwhelming combat power at the decisive place and time."[33] This principle applies to both defense and offense simultaneously. Identifying a tunnel complex allows all resources to focus on that specific area. But, when forces are faced with actually having to fight in the tunnel, the massing of resources is restricted. Although the ability to mass proved to be an inhibiting factor, the United States ground forces were successful through the use of modified techniques which will be discussed in Section IV.

Field Manual 100-5 states that economy of force is the ability "to employ all combat power available in the most effective way possible; allocate minimum essential combat power to secondary efforts."[34] Should United States forces have to attack within a subterranean facility, economy of force would work to their advantage. The employment of small units to accomplish the task allows the remainder of the force to be available for additional operations. Subsequently, since the size of the tunnel dictates the size of the force, ground commanders are able to tailor their units to the threat, thus employing combat power in the most effective manner.

Field Manual 100-5's "Surprise" is the ability "to strike the enemy at a time or place or in a manner for which he is unprepared."[35] What better way to achieve this result than to appear from below? Imagine the possibility of being able to completely bypass an enemy by moving underground, surface, then annihilate him before he has the ability to react. This possibility could have been realized by Union forces at Elliot's Salient, and by the British at Messines Ridge. Certainly, this concern is real with today's North Korean threat. As

Section III will reveal, some tunnels on the Korean peninsula have been located. More are suspected.

Clearly, these five principles of war are key in the analysis of subterranean tactics. They are also important to the United States Army because they provide fundamentals for operating in a different battlefield dimension. Because subterranean warfare presents unique conditions does not necessarily mean that the United States Army cannot fight with the doctrine it already has. However, the foregoing analysis presents enough evidence that a subterranean threat may be different enough so as to cause inordinate expenditure of lives, time, and effort. In view of this, a review of existing doctrine to examine adequacy in subterranean warfare is clearly worthwhile. It is in providing criteria for evaluation that these five principles of war will serve the purpose of this paper.

III. IS THERE A FUTURE THREAT?

"The tension on the Korean peninsula is the greatest security concern currently in Asia."[36]

–General John Shalikashvili

Does the United States Armed Forces face an enemy that is capable of mounting a substantial subterranean offensive? The answer to this question is yes. North Korea, although facing tremendous difficulty internally, is keeping its military up and running. The North Korean People's Army has formulated techniques to bring surprise and chaos to the army of the South as well as those United States forces stationed there. One such technique is the use of underground tunnel systems that run from the North to the South beneath the Demilitarized Zone. These tunnels are large and capable of moving mass numbers of troops quickly and efficiently. If faced with the situation, a battle could occur underneath the ground on a large scale. It could be considered subterranean, urban combat. This being the case, realizing that United States forces have never faced an underground threat this large, only the experiences of the past are available to combat such a threat.

There are three areas covered as this monograph shifts from subterranean threats of the past to subterranean threats of the future. First, it provides an overview of the North Korean Peoples Army as well as some of the domestic concerns of the country. Second, it shows the capability of the North Korean tunnel networks and how the army intends to employ these networks. Finally, it reveals characteristics of the fortifications which the

North Korean Army uses and lends some additional insight into the unique capabilities of this force. Remember, when an army is small and weak compared to its adversary, it needs an edge to win the fight. The North Koreans have such an edge with their subterranean capabilities.

The North Korean Peoples Army

The regular army of North Korea consists of 1,128,000 troops and a reserve force of 4,700,000. A normal term of service in the army is five to eight years. Thereafter, much like the United States inactive reserve, the North Korean soldiers are required to serve in the Workers/Peasant Red Guard to age sixty. The North Korean weaponry consist of some 3,400 main battle tanks, 540 light tanks, 2,200 armored personnel carriers. In 1994, the government of North Korea spent $5.6 billion, against $5.3 billion in 1993.[37]

Based on current news reports, the condition of the North Korean People's Army is unclear. The North Koreans could invade at any time but, on the other hand, they may be in such sad shape that they would be unable to mount such an offensive. According to official reports, and in the world newspapers, the economy in the North is in ruins. Floods have ruined crops and agriculture is in a dismal state. Food and other essentials may also be in short supply. The economic isolation of North Korea by the West has negatively impacted the economy, and their exports are often restricted. Aside from trade with other rogue nations like Iran, Iraq, and Libya, North Korea has few legitimate trading partners. The possibility exists that the North Koreans might launch an attack in a desperate gamble to avoid economic collapse. This gamble may lead to negotiations with the United States and

could, in the end, lead to a formalized peace treaty and normalized political and trade relations. [38]

Even though there is a lot of disagreement about whether or not North Korea will invade South Korea, there is a lot of agreement about how they would do it. The first step, in all probability, will be that the North Korean Army would send its special forces into many areas of the South. These Special Operations Force (SOF) units are capable of infiltrating far from the front lines. The 80,000-strong force can arrive via boats, submarines, hovercraft and light planes. This is the reason why the South Koreans rake their beaches every night. The North Korean special forces can attack South Korean and United States command posts, communications centers, and supply depots. They can try to destroy and damage military aircraft and generally create chaos in the South. These special forces units, as in most armies, comprise some of the best troops in the North Korean Army. While the special forces are launching their attacks, it is expected that North Korean artillery and short-range missiles will open up. The artillery will target key South Korean and United States forces and the capital of Seoul, which is located only thirty miles south of the border.[39]

Next, masses of North Korean tanks and trucks will pour across the border. Of course the South Koreans have always expected this and have constructed very intricate defenses for this eventuality. Anti-tank ditches, concrete walls and other barriers will force the North Korean tanks into narrow "killing zones" where the defenders of the South will focus their firepower. But the North Koreans also know about these defenses and have

figured out other ways to get their troops across the border. Most likely, the North Koreans will use underground tunnels to move their troops into the South. The South Koreans have discovered four of these tunnels, and fully realize that this is a primary means of infiltration for the army of the North. The North Koreans have also built formidable river crossing units, as water does block any number of access routes into the South. Intelligence sources have indicated that the North has built 2,300 pre-fabricated sections of bridging and has more than 600 amphibious vehicles.[40]

The North Koreans blitzkrieg-type attack will focus early on the capture of Seoul. They will try very hard to accomplish their military objectives before United States reinforcements can arrive from Japan, the United States, and Europe. United States air bases and forces in Japan can fall prey to missile attacks. North Korea has a few nuclear weapons, but means of delivery has been a problem. What is more likely is a chemical weapon attack. North Korea reportedly has several tons of chemical weapons in their stockpile.[41]

The United States and South Korea can quickly establish air and naval superiority over the North. While it might take some time to then decimate ground units, superior allied firepower and technology practically assures the eventuality. In the end, North Korea will be destroyed.[42]

The scenario outlined above is a little different from that in 1950, when the Korean War broke out. Today the South Korean military is no longer a pushover, and the South Koreans are backed by about 35,000 United States troops. Many more allied troops and

planes are stationed only a short distance away in Japan. Additionally, conventional knowledge is that China views a North Korean invasion as a threat to their security. Therefore, they probably will not aid the North Koreans, as they did during the Korean War.

Again, it is unlikely the North will invade because it would be "suicide" for them. But, on the other hand, the North may think that the risk is worth it. Recently, the North Koreans repositioned heavy artillery and aircraft closer to the border. Due to this recent move, one group of North Korean bombers has the capability to reach Seoul in approximately six minutes. That doesn't allow much warning. Conversely, North Korean military exercises have been at a low level recently. To date, no unusual troop movements have been observed.[43]

Will the North invade the South? It is a possibility that it will happen at some point in time. The North Koreans may believe that they have few other logical alternatives. If it does happen, it will not be as easy as the 1991 Gulf War. It will be a difficult, demanding, and bloody conflict. Most professional warriors pray that there is a diplomatic resolution to the increasing tensions in Korea; but, they will be prepared for a military solution should one become necessary.

North Korean Tunnel Capability

Tunnels have been perfected by the North Korean People's Army. No other country even approaches the truly awe inspiring levels attained by the North Korean People's Army. The use of underground facilities dates back to June 1950, with the commencement of the

"Fatherland Liberation War" and the quick realization that the United Nations Command firmly controlled the air. The North Korean People's Army has conducted the most extensive fortification program in modern times. This has resulted in the systematic hardening of almost all strategic industries and military facilities including: naval bases with underground tunnels connecting the ocean/land sheltered inland harbors; surface-to-air missile sites with radar that are raised to the surface; and a network of tank storage tunnels.[44]

Between November of 1974 and March of 1990, four large tunnels were discovered under the Demilitarized Zone (diagram 4). Amazingly, one of the tunnels had a depth of 450 feet. Even though four of the tunnels were discovered by Republic of Korea soldiers, there are indications of twenty more such tunnels. These tunnels are very important to the overall invasion plan and provide the major attack corridors to Seoul. The four discovered tunnels were capable of allowing 10,000 troops per hour to enter South Korea.[45]

As discussed earlier, the tunnels are a major part of North Korea's invasion ability. There are approximately twenty three North Korean divisions along the Demilitarized Zone; each is reported to be responsible for digging its own infiltration tunnel. If in fact twenty tunnels exist, the North Korean Army has the capability of pushing all of its front line divisions into South Korea in approximately one hour.[46]

The infiltration of troops is not the sole purpose of the North Korean Army's use of tunnels. In and around Pyongyang, the North Koreans have invested considerable time and effort in the protection of military weapons systems from air attack and artillery fire through

the use of hardened underground facilities. These facilities not only protect but allow for freedom of movement of these weapon systems. A field artillery piece, for example, can be moved along a tunnel shaft to a variety of preplanned openings. These openings allow for different angles of fire while making counter battery fire difficult for enemy forces. Even against precision strike weapons, a North Korean weapon system in hardened, subterranean positions will most likely survive.[47]

Within the miles of tunnel network are tactical bunkers which provide the living accommodations to soldiers. These bunkers are constructed of reinforced steel and concrete and, in some cases, are connected to other bunkers. These reduce surface movement and make detection that much more difficult.

The North Korean Army also makes good use of trench systems. A typical machine-gun position, for example, is made of reinforced concrete and is connected to other positions via a trench system. The systems have been well thought out and are usually placed on high ground to optimize the range of the weapon and to provide good fields of fire. The trench systems, much like World War I, allow for command and control while providing maximum protection to the soldier. Additionally, many of the mortar positions utilize effective trench systems in much the same way. The mortar pits are approximately seven yards apart and are attached with trenches. The trenches allow for extensive systems of mutually supporting mortar positions.[48]

The Republic of Korea indicates that efficient chemical weapons research facilities are located in the Kanggye, Sinuiju and Hamhung areas. They consist of a number of

special underground storage tunnels dug out from mountains. These tunnels contain filled warheads, bulk agents stored in four meter high tanks, chemical warfare protection and detection equipment, and decontamination agents.[49]

The North Korean subterranean threat is one that is real and potentially very dangerous. Imagine being overrun by an enemy that appears from nowhere. This is an enemy that has prepared itself over a period of forty years to fight and live in subterranean conditions. This is an enemy not necessarily different from any other, but one with an extensive subterranean capability that is quite unique in terms of size and usefulness. Where the tunnels in Vietnam ran for meters, the North Korean facilities run for miles. Where one man moved through the Vietnam tunnels, armies can march through the North Korean facilities. Can United States forces fight in these tunnels and survive?

North Korean Fortification Characteristics

Continuing with North Korean capabilities, it is important to further study the characteristics of their fortifications and defensive systems. Elaborate fortifications exist in depth in the Demilitarized Zone, along the North Korean coast, and in other areas considered critical by the North Korean People's Army. These fortifications, as mentioned earlier, are constructed of reinforced concrete, steel, and logs, and contain ammunition storage rooms and living quarters for personnel assigned to various sections. Because they seek to locate positions in places inaccessible to enemy armor, the North Koreans select hilltops as principal defensive positions. Most of the defensive positions are on or near the topographical crest of a ridge line or hill and provide for a three-sided defense. Additionally,

the positions are mutually supporting in depth between hill masses. All positions are fortified, well supplied with ammunition, and tied together by interlocking fire.

During the Korean war, the strongest North Korean Army defense focused on valley corridors containing principal roadways. A typical North Korean fortification consisted of foxholes for riflemen, automatic weapons, and mortar positions, all connected by communication trenches. The North Koreans placed primary defensive positions on the forward slope. Communications trenches connected these positions to personnel shelters on the reverse slope. All positions afforded cover from high-angle fire and at the same time permit good fields of fire. Entrenchments on the forward slope allowed North Korean forces to toss grenades down the hillside on hostile assaulting forces.[50]

Hilltop fortifications, from four to fifteen feet in depth, were covered with alternate layers of logs and dirt, between three to twelve layers. All bunkers were connected by communication trenches. Ammunition storage compartments were also joined to the main network of these defensive positions by trenches. All brush and inflammable material was cleared from the vicinity of the defensive works as protection against hostile incendiaries. Lips of dirt were placed around some bunkers located below the military crest to divert the flow of napalm attacks. Two or three man foxholes were dug about six or eight yards apart on the forward slope and manned until hostile artillery fire was received. At this time, the troops moved through communication trenches or tunnels to underground personnel shelters, accommodating six to eight men, on the reverse slope. Once artillery fire was lifted, the troops reoccupied their former positions on the forward slope.[51]

Mortar and artillery pieces were employed in well fortified positions on or just below the reverse slope. To overcome the restrictions on the field of fire caused by overhead cover, the North Koreans resorted to unusual methods of employing artillery when time and circumstances permit. Pieces, located in well constructed bunkers on the forward slope of a hill, were fired and resupplied while under cover. Escape tunnels leading to the reverse slope allowed for evacuation of the pieces.[52]

One of the most effective means of defense employed by the North Koreans was camouflage. During the Korean war, units up to battalion-size escaped aerial detection during the day by sleeping in ditches covered with pine branches. They also rolled up in straw mats and lay in orderly rows like piles of straw. Camouflage discipline was excellent. When hostile aircraft were spotted, the North Koreans placed their rifles between their legs, squatted, and kept their faces toward the ground until the command was given to move. Dummy tanks and aircraft attracted considerable air strafing and bombing during the Korean War. Artillery positions made of natural material were emplaced in the standard horseshoe manner. Stacks of empty cases were scattered around each simulated gun. Realism was stressed in camouflage measures. Dummy artillery positions were made to appear realistic by maintaining signs of activity around the various positions. The North Koreans made maximum use of tunnels and caves for supply depots.[53]

Having looked at the North Korean People's Army, their tunnel capabilities, and their fortification characteristics, the question becomes: Why is this important? It is important because it is real. The Army of North Korea is among eight of the largest armies

in the Pacific region[54]. The country is cut off from free trade which places it on the edge of economic ruin. Consequently, the people of North Korea have a lot to gain by invading their Southern brothers.

Though poor, the North Korean Army still has the capability to mount a strong offensive attack as well as a formidable defense of its territory. It is prepared to send large numbers of troops through tunnels. Stealth and speed is the key to its success; thus, the tunnels become a combat multiplier for the army of the North. Additionally, they have spent years fortifying their country against an invasion from allied forces. Their positions are located on high terrain and are dug-in, affecting the offensive movements of friendly forces. Their artillery is numerous and concealed in tunnels. These tunnels are opened and closed as needed, hence protecting the artillery from aerial attack.

A furious debate has been raging among intelligence, military, and national security experts. Will North Korea attempt to militarily invade South Korea? If so, how will they try to do it? This is a question that comes with no easy answer. The only thing that United States forces can do is continue to train and attempt to prepare for what may occur. As a part of that training process comes the need for solid doctrine and tactics to fight a force well suited to underground survival. The Army of North Korea will fight tenaciously in an attempt to accomplish the task of unifying Korea. To be successful, it will have to utilize all available means which assuredly includes subterranean tunnels, strong fortifications, and a well planned surprise appearance at a critical time and place. The United States military is well suited for conventional combat with the North Koreans. But, what if the fight takes a

more unconventional twist within the miles of tunnel facilities in and around the Demilitarized Zone? Does the United States know how to face that threat based on the experiences of the past? What current doctrine allows United States leadership to train soldiers to accomplish this task? The final part of this monograph will explore doctrine in an attempt to determine who would prevail in such a fight.

IV. IS THERE SUFFICIENT UNITED STATES ARMY DOCTRINE TO COMBAT A SUBTERRANEAN THREAT?

> *Doctrine is the statement of how America's Army intends to conduct war and operations other than war.*[55]
>
> –FM 100-5

Innovations From Vietnam

The threat of tunnel warfare and the adequacy of doctrine for combating the subterranean threat are the foci of this monograph. Despite years of combat dealing with subterranean tactics the United States has not established doctrine specific to the art of tunnel fighting. Lessons from Vietnam provide the most informative account of United States forces fighting in tunnel systems. The soldiers from that era did provide innovations and captured lessons learned that are still relevant today.

Several effective methods of tunnel destruction emerged from Vietnam. For example, tunnels within ten feet of ground surface were destroyed with acetylene gas, air blowers, and small explosive charges. Acetylene generated on the spot was forced into the tunnel by blowers. With all openings sealed, small charges were detonated, thereby exploding the mixture of acetylene and tunnel air and usually causing the roof of the tunnel to collapse.

As an illustration, in the village of Ben Suc, in January 1967, South Vietnamese forces destroyed a large tunnel and bunker complex. In the destruction of these facilities,

South Vietnamese forces used a "chemical section tunnel team" attached to the United States 1st Battalion, 26th Infantry. The team was successful in using the acetylene technique. This process rendered the tunnel useless, destroying everything left inside.[56]

American efforts at determining tunnel traces from the surface met with partial success. Obviously, destruction by surface means would have been the most effective way of eliminating tunnels. For tunnels deeper than ten feet, charges with sacks of powdered riot control agent, blown in a series at one hundred foot intervals along the passageways, made the tunnel uninhabitable. The explosives detonated and blew the powder into the walls between the collapsed sections. The chemical remained effective from two to six months making the remaining sections of the tunnel unusable. An instance related to the use of chemicals occurred on January 18, 1967. 1st Battalion, 5th Infantry discovered a major tunnel complex in and around the Ho Bo woods. After an extensive six day search of the complex, the task was turned over to units who pumped the tunnels full of riot control agents. Then, once it appeared that no enemy were going to appear, they blasted the tunnel.[57]

An additional anti-tunnel tactic was the destruction by flooding. This idea, however, was like trying to fill all the water pipes in a new house by pouring water into an open pipe from above. Without knowing all the potential air locks, and without sealing all appropriate outlets, this method would not have a chance. Moreover, the sheer volume of water required was tremendous.[58]

Understandably, tactical commanders were reluctant to keep combat troops on alert security status after a tactical operation just to allow time for deliberate destruction of Viet Cong tunnels. Consequently, engineers constantly sought faster and more effective means of destroying the tunnels.

These innovations are important because they demonstrate that soldiers were learning from their encounters with tunnels. It also shows their initiative in developing better techniques for combating the situation in their era of war. Despite these ideas, men were still going into the ground to place eyes on the target and to eliminate any enemy found within the complex. If the tunnels were as large as tunnels in North Korea, what would their tactics have been like? To try and answer this, it is important to next examine some United States Army doctrine and determine its usefulness as well as its applicability to the larger scale threat that exists in the world today.

Current United States Doctrine

Between August 1991 and June 1993, the United States Army formulated and published a fighting doctrine recast to fit the power demands of a new strategic world. The Army's earlier "AirLand Battle" doctrine, first issued in 1982, had provided a central element of the NATO deterrence through the 1980's against the threat posed by the Soviet-dominated Warsaw Pact. That doctrine had also furnished the war-winning operational maneuver in the Gulf War of January-February 1991. A new order of power was evolving. However, in the early 1990s that forced Army planners to a basic doctrinal reformulation.[59]

Research indicates that Field Manual 90-8, *Counterguerrilla Operations*, dated August 1986, is the most current doctrine available that specifically discusses tunnel warfare. According to this field manual the first step in detecting or locating a tunnel is to reduce a large geographical area of interest to a smaller area of probable locations. This can be accomplished by studying general indications of probable tunnel locations. Some indications that tunnels are being employed by the enemy forces are, movement of enemy in a specific direction after being spotted by aircraft, sniper fire occurring from areas where there are no obvious avenues of withdrawal, vegetable gardens far from places of habitation, operations where guerrillas inflict casualties at relatively long range and disappear without making close contact or being detected by friendly forces, and the smell of burning wood or food cooking in an area lacking habitation.[60]

Entering an area with a tunnel complex requires a doctrinal approach. Security on the flanks and rear is imperative. The size of the objective area determines the strength of the unit assigned to the search mission. The unit, company, or platoon is tasked organized for tunnel operations. For example, a company is sub-divided into three elements, security, search, and one reserve. The unit will conduct a slow and methodical search. Systematically searching every square meter, the security element moves concurrently toward the limits of the search area. Once a tunnel is discovered, the security element surrounds the area while the search team prepares to destroy or neutralize the tunnel.[61]

The anti-tunnel unit may require special equipment to perform tunnel operations. A mine detector is utilized to detect ammunition and weapon caches. Grenades are available,

but not used after friendly forces enter the tunnel. Once tunnel operations are complete, demolition charges are used to destroy the tunnel system. Because of the complexity of charges needed to destroy some tunnel complexes, an engineer team should support the search unit. An air generator forced smoke into the tunnel complex, followed by flashlights and a .45 caliber pistol to search inside the tunnel.[62]

This doctrinal excerpt offers techniques that are still viable today. As the monograph moves to an analysis of the United States versus North Korea in subterranean warfare, its application has merit.

Who Gains The Advantage?

One way to demonstrate whether United States tunnel warfare doctrine is adequate (or not) is to analyze its effectiveness in a modern North Korean scenario. Such an analysis takes a possible North Korean course of action, pits it against a possible Allied course of action, and determines the results using a predetermined standard. In this case, the criteria consisting of the five principles of war explained in Section II serve as the standard.

The North Korean People's Army offensive will be in four phases. In Phase I, their objective is to infiltrate Special Operations Forces, supported by artillery fires, to paralyze key United States and Allied installations as well as Seoul. In Phase II, close operations, the North Korean People's Army will focus on penetrating the center of Allied defenses, thus weakening the middle for the main efforts' drive into Seoul. In Phase III, the main effort will move through tunnels in an attempt to gain the initiative through surprise. In the scenario, the North Korean Army will operate with a rear corps as their reserve.

The most likely North Korean People's Army course of action begins with an 80,000 man special operations force, operating in small teams, conducting deep operations to destroy Allied command posts, disrupting communications, and destroying supply depots. Additionally, these teams will identify, mark, and secure the primary infiltration routes for their main effort. North Korean conventional armored and motorized rifle "shock" troops will attempt to penetrate the Allies forward defense line at many places, but the main effort will strike directly at Seoul.[63] The North Koreans will then attack in three echelons. The initial echelon will consist of an artillery barrage followed by a massive commitment of infantry and tanks. Two follow-on echelons made up of tank and mechanized infantry divisions will then exploit any penetration.[64] Such an attack will bypass, then surround Allied defensive positions in order to maintain momentum and concentrate combat power.[65]

According to a 1996 *American Reporter* article, should North Korea invade the South, they will use tunnels as primary routes to Seoul. North Korean infantry followed by mechanized and armored units will pass through the tunnels to seize terrain in and around Seoul. The tunnels provide the North Korean forces OPSEC and protection from air attacks, and artillery. Additionally, the tunnels offer opportunities for surprise attack, which the North Korean Army deems indispensable.[66]

The Allied response to the North Korean offensive will be in three phases. In Phase I, the Allied forces will conduct deep operations. Its objective will be to destroy enemy artillery, tanks, and suppress enemy air defenses. In Phase II, close operations, the Allied

forces will focus on a defense-in-sector along the Demilitarized Zone in an attempt to deny the enemy the capability to gain the initiative. In Phase III, the Allies will conduct counter tunnel operations to render these avenues of approach ineffective, thus reducing the subterranean threat. Friendly fires will target key avenues of advance, suspected north Korean facilities, and will counter-fire against North Korean artillery. The Allied reserve will consist of a tank task force.

The most likely Allied course of action will use attack aviation units to conduct deep attacks, thus destroying enemy artillery positions and tanks and assisting with the suppression of enemy air defenses. Additionally, attack aviation will set the conditions along the primary Allied infiltration routes for the main effort should Allied forces counterattack. Allied forces will initially defend within a heavily fortified defensive line two to five miles south of the Demilitarized Zone, thus denying enemy forces the ability to exploit the initiative and gain the speed they desire for their offensive.[67] Allied mechanized and light forces will place special emphasis in the areas where tunnels are thought to exist.

The overall offensive plan for the tunnel networks relies heavily on infantry. Light infantry forces will conduct reconnaissance missions to pinpoint suspected tunnel locations and monitor the movement of enemy forces. The infantry will then attack enemy forces as they enter and exit the networks. The mechanized force in the center will attack enemy forces exiting the tunnels to deny sufficient maneuver space, thus disrupting their ability to consolidate and advance. The Allied infantry forces will not, however, pursue and engage

North Korean soldiers in the tunnels. Allied light forces will only enter the tunnels as part of post hostility operations.

An analysis of the enemy course of action brings out the following key points. First, the offensive will initially favor the North Korean Army. Their main effort will penetrate Allied defenses in the center sector of the Demilitarized Zone, seizing direct routes into Seoul. Second, the preemptive attack from tunnels will achieve strategic surprise. Contemporary intelligence indicates that there are numerous tunnel networks along the Demilitarized Zone that will facilitate the North Korean Army's initial thrust. Third, the North Korean soldier's ability to maneuver while in the tunnels will be limited. Although they may gain surprise, they will risk the loss of their forces should they become trapped in the tunnels. Fourth, a force as large as they intend to move through the tunnels will require large assembly areas which may not be available if surprise is lost. Their inability to mass forces and continue the advance into Seoul will defeat the use of the tunnels. Finally, economy of force in this course of action is only effective if the North Koreans are capable of luring the Allies into the tunnels.

The Allied course of action analysis reveals the following points. First, defensive operations will feature a counterattack force. This counterattack force should be able to eventually destroy any North Korean force penetrating Allied defenses. Second, surprise will be an Allied weakness; they must initially react to a preemptive invasion. Although the North Korean Army will have the initiative, Allied forces should have sufficient combat power to eventually defeat the North Korean mechanized forces, provided the effects of

Allied deep operations are successful. Third, the Allied counterattack forces' best option for maneuver will be to fight the bulk of enemy forces above ground-at the entrances and exits of their tunnel facilities. Allied mechanized forces north of Seoul, but at the southern exits of the tunnels, should be able to mass units to disrupt enemy forces as they emerge. This tactic should prevent the North Korean Army from advancing on Seoul. Fourth, massing forces at the exits of the tunnels and along the Demilitarized Zone will disrupt and slow the initial North Korean penetration. Finally, economy of force will allow the Allies to concentrate specific units at the tunnel exits, denying the enemy key terrain for their offensive into Seoul. Once the area around the tunnels are secure, forces will be able to enter the tunnels for clearing and subsequent destruction. At the operational conclusion, the Allies will again occupy defenses to the north of Seoul and at strongpoints along the Demilitarized Zone. All tunnels will then be destroyed through the use of demolitions to eliminate their future use.

The following matrix summarizes the aforementioned course of action analysis.

Decision Matrix

Criteria	Offensive	Maneuver	Mass	Economy of Force	Surprise
NKPA	+	−	−	−	+
Allies	−	+	+	+	−

A direct comparison of the courses of action, using the criteria as a framework, shows the following:

(1) Offensive. The advantage initially belongs to the North Korean Army. Although Allied intelligence provides early warning, only the North Koreans know when and where they are going to attack. Their subterranean routes are designed to seize the initiative through surprise and speed. However, the Allied forces will eventually react and be able to deny key terrain the North Koreans need to continue offensive operations.

(2) Maneuver. The Allies have the overall advantage. Remaining above ground allows for freedom of action to counter the North Koreans as they enter or exit the tunnels. The North Koreans, once committed within the tunnels, can hardly maneuver. Their only recourse is to maneuver forward or backwards.

(3) Mass. The advantage of mass is on the side of the Allies. Although 10,000 North Korean troops can move through the tunnels per hour, they are going to need terrain for assembly areas. The Allies will be able to mass units in and around the tunnels, denying the enemy the terrain, and preventing them from massing.

(4) Economy of Force. The North Korean Army, intimately familiar with the tunnels definitely has the advantage, in terms of economy of force, in any combat within the tunnels. However, it does not make doctrinal sense for the Allies to enter the tunnels to fight. The Allies will more likely try to destroy the North Koreans at and around the tunnel entrance and exits. In this sense will the Allies be able to exercise economy of force better than the North Koreans

(5) Surprise. This is an obvious advantage for the North Korean Army. Allied forces have no way of knowing where all of the tunnels are. Therefore, the threat of

the North Korean Army gaining an early initiative is likely. Clearly, speed and surprise are essential to the success of a North Korean People's Army operation. Enemy tunnels are designed to allow troops to appear from unexpected locations; thus lies the danger in defending against such a tactic. On the other hand, the Allies may not initially know all the tunnel locations, sophisticated contemporary technology and historical intelligence studies will assist in the timely identification of the locations of most, if not all, subterranean passageways.

Overall, this scenario favors the Allied forces. The Allies should be able to better maneuver, mass, and economize forces provided they do not attempt tunnel combat operations. The North Korean Army has the advantage initially with the offensive as they begin to infiltrate south. Their ability to appear in uncertain locations should provide the advantages of speed and surprise, forcing the Allies to react in some way to the situation.

V. DISCOVERIES AND CONCLUSIONS

"We learn from history only that we do not learn from history."[68]

–Captain Liddell Hart

United States Army doctrine is adequate against the threat of subterranean warfare in contemporary times. To arrive at this conclusion, this monograph provides (1) a historical account of subterranean tactics; (2) a description of North Korean Army capabilities, operational methods, and preparations; and (3) a course of action analysis to illustrate a fight between the North Korean army and Allied forces. History indicates that subterranean tactics gives the force employing them an advantage on the field of battle. From the Civil War to Vietnam the impediment imposed by such techniques was formidable. The North Korean Army capabilities are frightening in light of the fact that they have been preparing subterranean facilities for over forty years. However, the course of action analysis, coupled with each of the highlighted principles of war, reveals an ability to combat the threat. Thus, this author concludes that sufficient means exist and that current doctrine is adequate.

Although doctrine is adequate, it is important to consider warfighting doctrine at the strategic, operational, and tactical levels. True, a subterranean threat is only a small tactical part of a bigger war, but it is a battle that can be lost and even though the war is won. At the strategic and operational level Field Manual 100-5: *Operations* is the gospel, the

bedrock for all other doctrine. At the tactical level field manuals like 90-8: *Counterguerrilla Operations*, 90-101-1: *An Infantryman's Guide to Urban Combat*, and various 7-series manuals provide the tools and techniques that are applied for subterranean combat. The tools are available, they simply need to be assembled into a single format focusing on this specific concern. Because this threat does not face all units, Standard Operating Procedures can be formulated for forces like those in Korea, thus providing the tools required to win that elusive battle.

The effort of this study is not to question the United States Army's ability to conquer a subterranean threat, it is simply to raise awareness - awareness that possible doctrinal shortcomings exist. This monograph alludes to the answers and stimulates ideas about subterranean warfare and its viability. To many tacticians, the idea of tunnel warfare may sound ridiculous. However, to the Allied soldiers serving along the Demilitarized Zone in Korea, the idea is very real.

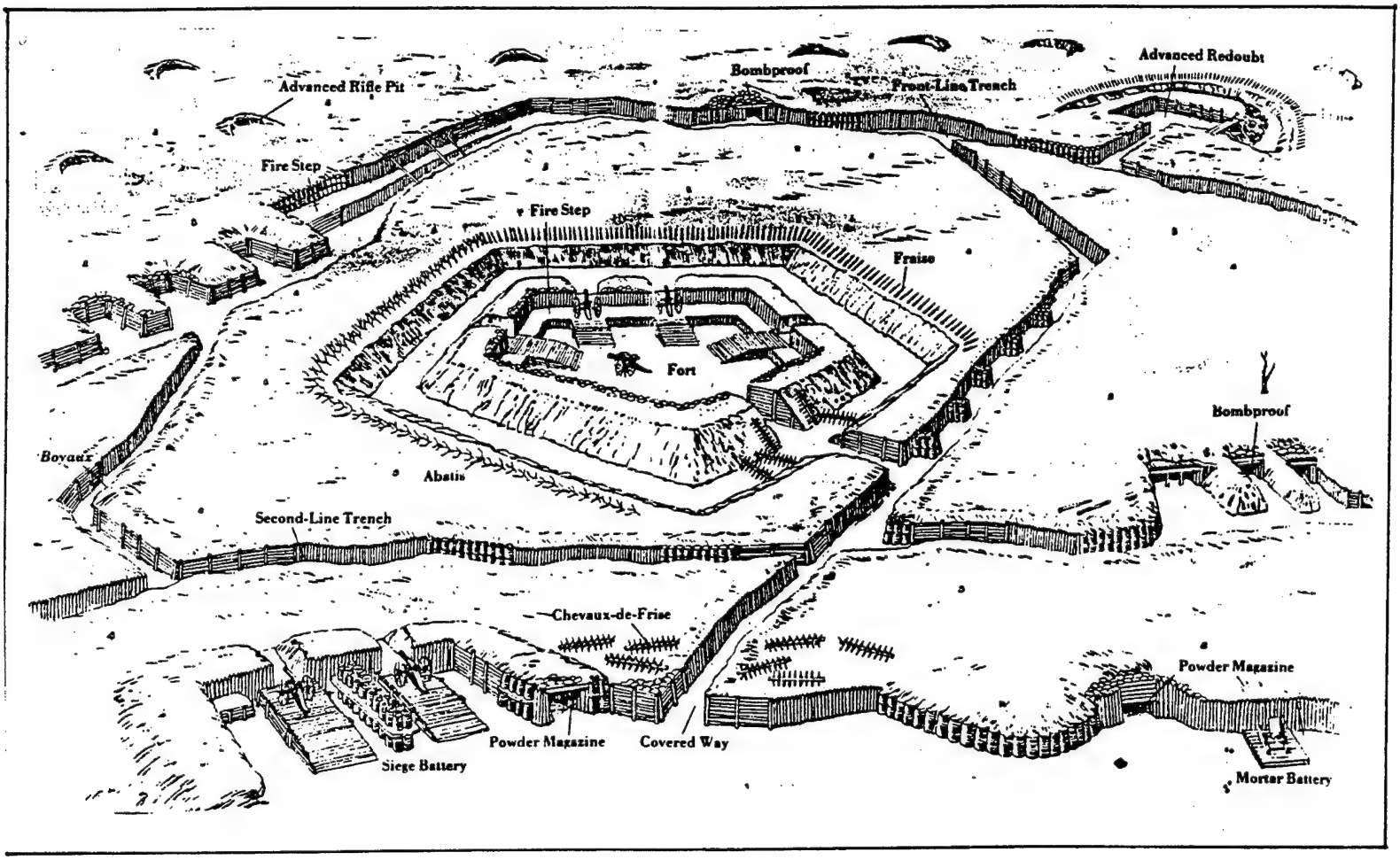

Diagram 1 - Entrenchments at Petersburg[69]

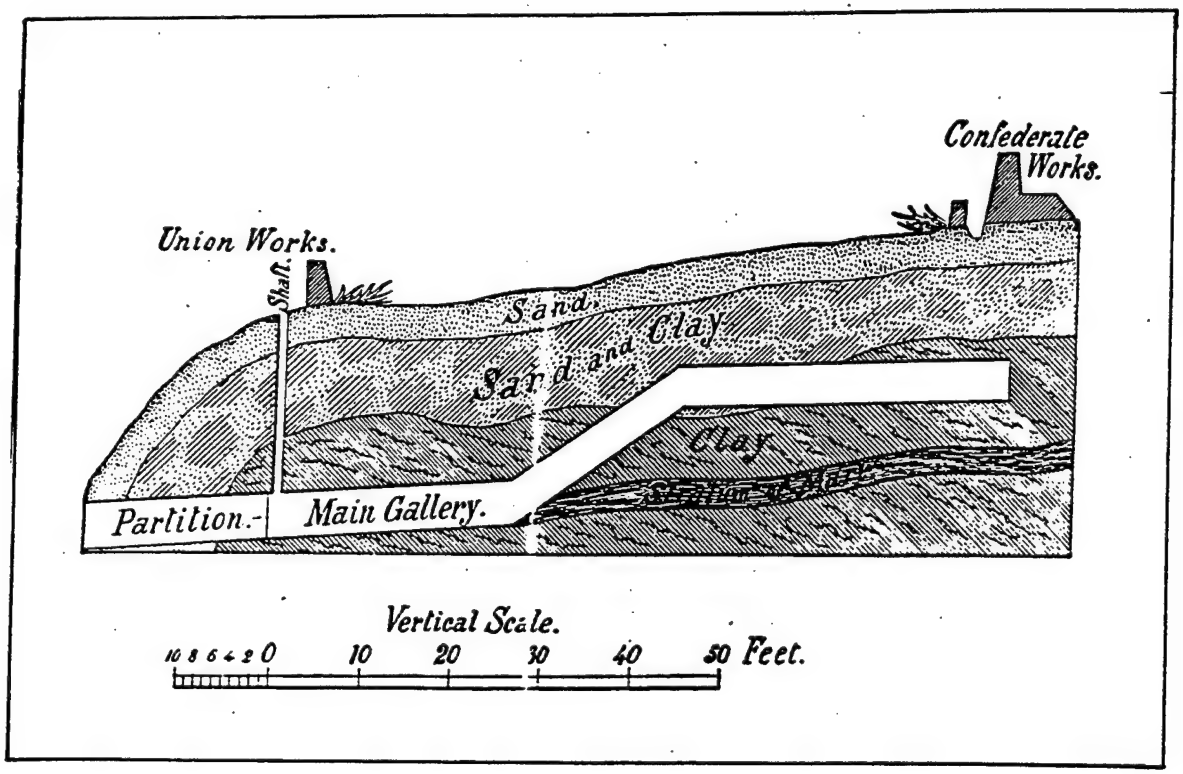

Diagram 2 - Tunnel Beneath Elliot's Salient[70]

Diagram 3 - The Tunnels of CU CHI[71]

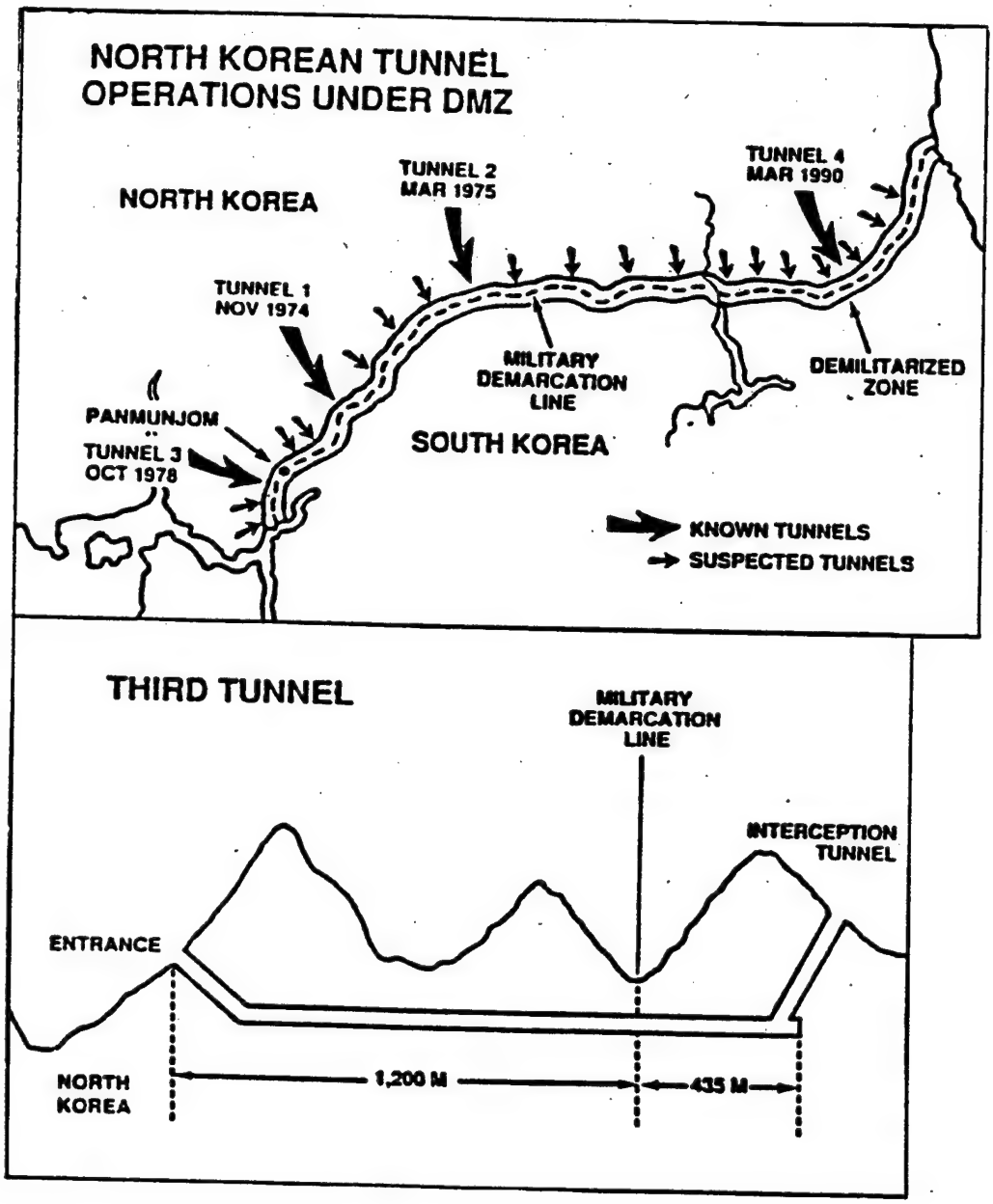

Diagram 4 - North Korean Tunnels Under DMZ[72]

Appendix A (Glossary of Terms)[73]

Communications Trench - A long narrow ditch to protect troops that allows free movement between two or more fighting positions thus creating redundancy among the positions.

Earthworks - A fortification made of earth.

Fortifications - A fortified structure or place, as a fort. A strengthening or encircling.

Obstacles - Something that stands in the way; a hindrance or obstruction.

Subterranean - Situated or occurring below the surface of the earth.

Subterranean Fortification - A fortified structure or place situated or occurring below the surface of the earth.

Subterranean Obstacle - A hindrance or obstruction situated or occurring below the surface of the earth.

Subterranean Threat - A menace or danger situated or occurring below the surface of the earth.

Trench - A long narrow ditch, especially one lined with a parapet of the excavated earth, to protect troops.

Trenchlines - A long narrow ditch designed to protect troops that extends the length of a front or runs the depth of a given complex.

Tunnel - An underground passageway or gallery.

ENDNOTES

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[73] Definitions for this glossary were taken from Webster's Student Dictionary. Portions of one definition may combine with another to relay an adequate description of the word as used in this monograph.

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